# RUN Z-XLR8 ON TS1500

## A FIX AT LAST!

Fred Nachbaur

TS1500 owners have had to do without Z-XLR8, one of the most popular programs for the TS1000, for a long time now. This remarkable (and inexpensive) tape operating system gives much higher SAVE/LOAD rates, plus other advanced tape options. Several individuals tried in vain to unearth the reason, thinking it had something to do with the subtle difference in the 1500's I/O ports. Similarly, some users can't get Z-XLR8 or other fast-load packages to run on their ZX81/TS1000 machines, no matter what they try. If either scenario describes your situation, read on; the fix is almost absurdly simple.

The key to the solution lies in the PHASE of the tape signal. On most recorders, positive-going pulses during recording results in positive-going pulses during playback. However, this is not always the case. Some recorders invert the signal, turning positive signals during recording into negative ones during playback. Seems weird, but for audio signals playback phase makes no difference whatsoever. Therefore, some tape decks invert the signal because it happened to simplify the design of those particular models.

Using the standard ZX/TS tape routines, phase doesn't matter; the normal tape signal is completely symmetrical, and therefore phase-independent. However, most fast-load routines depend on positive-going pulses to read the tape port. In other words, the inter-bit "space" must be negative-going.

The TS1500 contains a tape signal pre-conditioner similar to the "load amp" published in a previous issue. You guessed it - this one-transistor amplifier INVERTS THE TAPE SIGNAL! This is why, if you just happen to have an inverting tape deck, it WILL run Z-XLR8 with the 1500 (but not with the 1000)! The more usual non-inverting decks, however, will result in an "upside-down" signal to the 1500's SCLD, courtesy of the inverting transistor amp. This is also why Z-XLR8, SDS and similar routines will stop working on the ZX/TS1000 if you install my load amp circuit.

The fix, as promised, is very simple. Make up an inverted load cable! One way to do this is to cut a standard cable in the middle, then splice it together "backwards," i.e. the shield of one end goes to the center conductor on the other, and vice versa. Another way is to make up a backwards cable from scratch. This is diagrammed in Figure 1 below.

> ONE WARNING:
> Be sure to disconnect the MIC cable when using the backwards load cable! This is ALWAYS a good practise, but it's an absolute necessity when using an inverted load cable. (Otherwise, you'll short the EAR output; at best, it won't work, and at worst, it might damage your recorder.)

Another solution is to install another inverter, either by using a transistor (a la "load amp) or a TTL inverter such as the 7404.

At least one 1500 I've heard of DOES run Z-XLR8 with a standard tape deck, if the volume is turned all the way up. My theory is, that at such high levels, the 1500's transistor becomes so badly forward-biased that it stops working as an inverter. In other words, the signal is passed, uninverted, to the SCLD by "brute force." Even in such cases, the backwards load cable will help by greatly reducing the volume needed to successfully LOAD.

As an aside, this is also why most normal tape decks will not with the Commodore 64 or VIC20. To lock you into buying their "Data recorder," they (Commodore) designed their machines to require an inverted playback signal. The "backwards cable" trick (or an inverting pre-conditioner) will make any recorder work with these machines.

As a final note, the performance of both the TS1500 and also the ZX81/TS1000 can be improved by decreasing or removing the capacitor across the MIC jack. This results in a cleaner SAVE signal, and more reliable loads later. On the ZX81/TS1000 this is C11, on the TS1500 it is C18. Try removing it entirely; only if you then get a lot of "RAMpack noise" (a high-pitched whine) will you have to re-install a lower value. Decreasing it from the present value of .047 uF. (47 nF) to .01 uF. is generally all it takes.